CLAIMS

I CLAIM:

1. A system for detecting position deviations of an object having a curved surface, comprising:

a first lens having a first optical axis and a principle plane, the first lens positioned to receive and transmit therethrough light reflected from the curved surface;

a first body having at least a portion thereof that is substantially transparent to light, the first body being positioned proximate the first lens and configured such that the first optical axis extends therethrough, whereby at least a portion of the reflected light passes through the substantially transparent portion of the first body;

an image formation device positioned to receive the reflected light transmitted through the first lens and the substantially transparent portion of the first body and operable to form a reflected image based on the received reflected light; and

a moveable support configured to support the object and operable to move the object in at least a first axis that is parallel to the first optical axis, whereby the object is moveable between at least two positions relative to the principle plane of the first lens.

2. The system of Claim 1, further comprising:

a light source operable to supply light,

wherein the first lens is positioned to receive the light supplied by the light source and transmit the received light onto the curved surface.

3. The system of Claim 1, wherein the image formation device comprises:

a CCD element operable to receive the reflected light and convert it into electrical data representative of the reflected image; and

a display coupled to receive the electrical data and operable to display the reflected image.

4. The system of Claim 1, wherein:

the curved surface has a center of curvature; and

the reflected image has a substantially central portion that is formed on the image formation device at a position that is representative of a position deviation of the center of curvature relative to the first optical axis.

5. The system of Claim 4, wherein the moveable support is further operable to move the object to thereby substantially eliminate any position deviation.

6. The system of Claim 1, further comprising:

a light source operable to supply light along a second optical axis;

a half-mirror configured at a predetermined angle relative to the first and second optical axes and operable to reflect the supplied light along the first optical axis toward the first lens and to allow the reflected light to pass therethrough toward the image formation device.

7. The system of Claim 6, further comprising:

a mask having at least a portion thereof positioned between the light source and the half-mirror along the second optical axis, whereby a circuit pattern is formed on the curved surface.

8. The system of Claim 7, further comprising:

a light filter moveable into and out of the second optical axis between the light source and the mask, the light filter operable to remove predetermined light frequencies transmitted from the light source.

9. The system of Claim 7, wherein the mask is a pattern generator.

10. The system of Claim 7, further comprising:

a second lens positioned between the light source and the mask along the second optical axis.

11. The system of Claim 1, further comprising:

a third lens positioned between the first body and the image formation device along the first optical axis.

12. The system of Claim 11, wherein the first and third lenses are each concave lenses.

13. The system of Claim 1, wherein the image formation device is positioned along a third optical axis having a predetermined angle relative to the first optical axis, and wherein the system further comprises:

a half mirror configured at a predetermined angle relative to the first and third optical axes and operable to reflect the light that is reflected from the curved surface along the third optical axis toward the image formation device.

14. The system of Claim 13, further comprising:

a light source operable to supply light,

wherein the half mirror is further operable to allow the supplied light to pass therethrough along the first optical axis toward the first lens.

15. The system of Claim 1, wherein the first body is a stop ring that includes an opening formed therein that is substantially circular in shape and has a predetermined diameter.

16. A method of determining a position deviation of an object having a curved surface, comprising:

illuminating at least the curved surface;

passing light that is reflected off of the illuminated curved surface through a first lens having a first optical axis and a first body having at least a portion thereof that is substantially transparent to light;

forming an image having a substantially central portion on a surface using the reflected light; and

determining the position deviation based on a position of the substantially central portion of the formed image relative to the first optical axis.

17. The method of Claim 16, further comprising:

illuminating the curved surface with light from a light source.

18 The method of Claim 17, further comprising:

passing the light through the first lens and onto the curved surface.

19. The method of Claim 16, further comprising:

displaying the reflected image on a display device.

20. The method of Claim 16, wherein:

the curved surface has a center of curvature, and

wherein the image is formed at a position that is representative of a position deviation of the center of curvature relative to the first optical axis.

21. The method of Claim 16, further comprising:

moving the object to thereby substantially eliminate any position deviation.

22. The method of Claim 16, further comprising:

supplying light along a second optical axis;

reflecting the light supplied along the second axis such that the light is supplied light along the first optical axis and is directed toward the curved surface for illumination thereof.

23. The method of Claim 22, further comprising:

passing the supplied light through a mask to form a circuit pattern on the curved surface.

24. The method of Claim 23, further comprising:

selectively filtering the supplied light before it passes through the mask.

25. The method of Claim 22, further comprising:

passing the supplied light through a second lens positioned along the second optical axis.

26. The method of Claim 16, further comprising:

passing the reflected light through a third lens that is along the first optical axis.